Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_\_\_

**The Whoas of H-2-O Lab**

**Background**

Calcium carbonate minerals are the building blocks for the skeletons and shells of many marine organisms. In areas where most life now congregates in the ocean, the seawater is supersaturated with respect to calcium carbonate minerals. This means there are abundant building blocks for calcifying organisms to build their skeletons and shells.

Ocean acidification is the name given to the ongoing decrease in the [pH](http://en.wikipedia.org/wiki/PH) and increase in acidity of the Earth's [oceans](http://en.wikipedia.org/wiki/Ocean), caused by the uptake of [carbon dioxide](http://en.wikipedia.org/wiki/Carbon_dioxide) from the [atmosphere](http://en.wikipedia.org/wiki/Earth%27s_atmosphere). Generally speaking, about a quarter of the carbon dioxide in the atmosphere goes into the sea. As the amount of carbon dioxide rises in the atmosphere, there is a corresponding rise of carbon dioxide going into the ocean. When carbon dioxide is absorbed by seawater, chemical reactions occur that reduce seawater pH, making it more acidic. Calcium carbonate reacts with the acidic water to reduce the pH.

**Objective**

The purpose of this lab is to investigate the effects of ocean acidification on oysters in the Chesapeake Bay. You will explore the relationship between organisms and ocean water to determine whether it is a direct or indirect relationship and why.

**Hypothesis**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Materials**

-White Vinegar -Container with bay water -Oyster shell

-pH strips -Balance -Oven

**Procedure**

1. Record the initial pH of the bay water and make observations about the oyster shell.
2. Make a 50/50 solution of white vinegar and bay water.
3. Record the pH of the solution.
4. Record the initial mass of the oyster shell using the electronic balance
5. Place the oyster shell in the container filled with the solution.
6. Record observations.

Each class:

1. Dry the oyster in the oven for 10 minutes
2. Mass the dry oyster
3. Test the pH of the water
4. Record observations

\*\*You may store your lab sheets in your class folder\*\*

**Data Table**

Data Table #1 - Control

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date 🡪 |  |  |  |  |  |  |
| Mass of Oyster Shell (g) |  |  |  |  |  |  |
| pH of the Water |  |  |  |  |  |  |
| Color of Oyster Shell |  |  |  |  |  |  |
| Color of Water |  |  |  |  |  |  |
| Other Observations |  |  |  |  |  |  |
| Inferences |  |  |  |  |  |  |

Data Table #2 – Independent Variable

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date 🡪 |  |  |  |  |  |  |
| Mass of Oyster Shell (g) |  |  |  |  |  |  |
| pH of the Water |  |  |  |  |  |  |
| Color of Oyster Shell |  |  |  |  |  |  |
| Color of Water |  |  |  |  |  |  |
| Other Observations |  |  |  |  |  |  |
| Inferences |  |  |  |  |  |  |

**Results (Direct or Indirect relationship?):** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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-Acids vs. Bases

-pH

-Effects on the

Environment

-Examples

-Lab

**Conclusion**

**Post Lab Questions**

1. How did the oyster shell influence the pH of the water?

1. What happened to the oyster shell as the pH changed?
2. What do these results imply about the future health of shellfish and coral?
3. What are 3 specific things you and your family could do to help prevent releasing excess CO2 into the atmosphere?
4. Write the equation for the reaction.

**Extension**

What are some adaptations for this lab?? What else could you test? Design a lab including independent and dependent variables, controls, constants, materials, etc.

\*\*The best lab design(s) will win a prize!!\*\*